FOLDING STROLLER

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a folding stroller and, more particularly, to a folding stroller provided with a handle adapted to be set at either a back position that enables a person to push the stroller by the handle in a back-faced pushing mode in which the person faces the back of a baby on the stroller, or a front position that enables a person to push the stroller by the handle in a front-faced pushing mode in which the person faces the front of a baby on the stroller.

Description of the Related Art

Generally, there have been proposed various folding strollers for carrying a baby outdoors for walking and shopping. Those folding strollers are foldable, when necessary, to facilitate storing or carrying the same, are provided with a handle that can be set at a back position or a front position. A person is able to push the stroller by the handle either in the back-faced pushing mode in which the person faces the back of a baby on the stroller when the handle is set at the back position, or in the front-faced pushing mode in which a person pushing the stroller by the handle faces the front of a baby on the stroller when the handle is set at the front position.

In the stroller provided with the handle that can be turned between the back position for the back-faced pushing mode and the front position for the front-faced pushing mode, the handle is supported for forward and backward turning on the body structure of the stroller, the handle can be unlocked by operating a remote control device held on the handle, and the handle can be set at either the back position behind a seat supported on the body structure or the front position in front of the seat.

If the remote control device is operated accidentally in a state where the stroller is folded, the handle is unlocked

and, consequently, the body structure falls forward or backward.

SUMMARY OF THE INVENTION

The present invention has been made in view of the foregoing problem and it is therefore an object of the present invention to provide a folding stroller adapted to be set at either a back position for the back-faced pushing mode or a front position for the front-faced pushing mode, and adapted to prevent the accidental unlocking of the handle when the stroller is folded.

The present invention provides a stroller including a body structure adapted to be unfolded in an unfolded state for use and to be folded in a folded state; a handle supported on the body structure for forward and backward turning, and adapted to be set in either a backward-inclined position for a back-faced pushing mode or a forward-inclined position for a front-faced pushing mode; a handle locking mechanism for locking the handle in either a state for the back-faced pushing mode or a state for the front-faced pushing mode; wherein the body structure can be folded and unfolded with the handle locked on the body structure in the state for the back-faced pushing mode, and the handle locking mechanism includes a mechanism that permits unlocking the handle when the body structure is unfolded and inhibits unlocking the handle when the body structure is folded.

In the stroller according to the present invention, it is preferable that the handle locking mechanism includes a stopping projection formed on the outer side surface of the body structure, and a stopping member provided with a groove adapted to engage with the stopping projection, supported on the handle for sliding along the axis of the handle and biased in a locking direction to engage the stopping projection in the groove of the stopping member; the stopping projection engaged in the groove of the stopping member turns relative to the stopping member as the condition of the body structure changes between the folded state and the unfolded

state, and the condition of engagement of the stopping projection and the groove of the stopping member changes according to the angular position of the stopping projection relative to the groove of the stopping member.

It is preferable that the stopping projection has a shaft part engaged for turning in the groove of the stopping member, and an end part formed on an end of the shaft part so as to extend in a direction parallel to the axis of the handle when the stopping projection is at a first position where the stopping projection is located when the body structure is in the unfolded state and so as to extend in a direction perpendicular to the axis of the handle when the stopping projection is at a second position where the stopping projection is located when the body structure is in the folded state; and the groove of the stopping member has a stepped part that comes into contact with the end part of the stopping projection to restrain the stopping member from movement in an unlocking direction when the stopping projection is at the second position.

It is preferable that the end part has an elliptic shape.

It is preferable that the stroller further includes an operating device held on the handle, and a connecting member extending along the handle and having one end connected to the stopping member and the other end connected to the operating device, wherein the connecting member is pulled up by operating the operating device to move the stopping member biased in the locking direction in an unlocking direction opposite to the locking direction.

According to the present invention, since the stroller is provided with the mechanism that permits unlocking the handle when the body structure is unfolded and inhibits unlocking the handle when the body structure is folded, it is possible to prevent the forward or backward fall of the body structure when the handle is unlocked accidentally owing to some mistake when the body structure is folded.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic perspective view of a stroller in a preferred embodiment of the present invention;

Fig. 2 is a schematic side elevation of the stroller shown in Fig. 1;

Fig. 3 is an enlarged, schematic, fragmentary side elevation of a part III in Fig. 1;

Fig. 4 is a fragmentary perspective view of a part IV in Fig. 1;

Fig. 5 is a view of assistance in explaining the operation for turning a handle included in the stroller shown in Figs. 1 and 2;

Fig. 6 is an enlarged, fragmentary sectional view of the handle of the stroller in a locked state, in which a stopping member and stopping projection are engaged, when the stroller is in an unfolded state;

Fig. 7 is an enlarged, fragmentary sectional view of the handle of the stroller in a locked state, in which a stopping member and stopping projection are engaged, when the stroller is in a folded state, in which the armrests are turned up;

Fig. 8 is an exploded perspective view of a remote-control device shown in Fig. 1;

Fig. 9 is a view of assistance in explaining the operation of the remote-control device shown in Fig. 8;

Fig. 10 is a side elevation of the stroller shown in Fig. 1 folded in two; and

Fig. 11 is a schematic perspective view of the stroller shown in Fig. 1 folded in three.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the present invention will be described with reference to the accompanying drawings.

Referring to Figs. 1 and 2, a stroller 10 in a preferred embodiment of the present invention includes a pair of front legs 12 respectively provided with front wheels 11, a pair of back legs 14 respectively provided with back wheels 13,

and a pair of armrests 16. Upper end parts of the front legs 12 and the back legs 14 are joined pivotally to the armrests 16. An arcuate, flexible guard arm 18 is extended across and detachably joined to the front ends of the armrests 16. Parallel right and left pipes 17 are pivotally joined to the back ends of the armrests 16, respectively.

A front connecting bar 20 provided with a footrest 19 is extended between the front legs 12. A back connecting bar 21 is extended between the back legs 14. Side connecting bars 22 have front ends pivotally joined to middle parts of the front legs 12, respectively, and back ends pivotally joined to back leg support members 23 fastened to lower parts of the pipes 17. An upper connecting bar 24 interconnects the right and the left side connecting bar 22.

The front legs 12, the back legs 14, the armrests 16, the pipes 17 and the connecting bars 20, 21, 22 and 24, leg support members 23 and such constitute a foldable body structure. A fabric seat on which a baby is seated, and a bag of mesh and the like are attached to the front legs 12 and the back legs 14, which are omitted in Figs. 1 and 2 to facilitate understanding the general constitution of the stroller 10.

A substantially U-shaped handle 15 has lower end parts joined pivotally by a shaft 27 to the back leg support members 23 fastened to the lower end parts of the right and the left pipe 17 such that the handle 15 can be turned between a back position for the back-faced pushing mode indicated by continuous lines in Fig. 2 and a front position for the front-faced pushing mode indicated by two-dot chain lines in Fig. 2. The handle 15 has a right leg 15a, a left leg 15b and a remote-control device 40 connected to the upper ends of the legs 15a and 15b by joints 61a and 61b. The remote-control device 40 is operated by the user to unfold the stroller, to lock the handle 15 at a desired position and to unlock the handle 15.

Referring to Fig. 3, an L-shaped bracket 25 has a middle part pivotally joined to the back leg support member 23, and

a lower end part pivotally joined to the back leg 14. A stepped part 25a is formed in a free end part of the bracket 25. The stepped part 25a is engaged with a stepped part 26a formed in a locking member 26 for locking together the back leg 14 and the pipe 17. The locking member 26 is put slidably on the pipe 17 and is moved axially along the pipe 17 by the remote-control device 40, which will be described later. The back leg support member 23 is provided with a stepped part 23a. The stepped part 23a is pressed against the back leg 14 when the stroller is unfolded to hold the back leg 14 in an unfolded state.

When the stepped part 26a of the locking member 26 is engaged with the stepped part 25a of the L-shaped bracket 25 as shown in Fig. 3, the bracket 25 locks the back leg 14 and the pipe 17 together to hold the stroller in the unfolded state for use. When the locking member 26 is raised to a position indicated by two-dot chain lines by operating the remote-control device 40 as shown in Figs. 3 and 10, the bracket 25 is released from the locking member 26. Consequently, the back leg 14, the armrest 16, and the front leg 12 can be turned to positions indicated by two-dot chain lines, so that the stroller can be folded in two to facilitate carrying the same.

As shown in Fig. 1, a front stopping projection 28 and a back stopping projection 29 are attached to front and back end parts, respectively, of the outer side surface of each armrest 16 so as to project laterally. As shown in Figs. 4 and 5, stopping members 30 are put on the handle 15 so as to be axially slidable on the handle 15. As shown in Fig. 5, the stopping member 30 has a first groove 31 and a second groove 32 formed so as to open toward the pipe 17 in a surface facing the pipe 17. The first groove 31 is formed in a substantially L-shape and has an open end 31a opening toward the back. The second groove 32 is formed below the first groove 31 and opens forward and downward. As shown in Fig. 4, the stopping member 30 is biased axially downward by a spring 34b placed in the handle 15 for engagement.

The stopping projections 28 and 29 and the stopping members 30 (grooves 31 and 32) constitute a locking mechanism for locking the handle 15 at either the back position for the back-faced pushing mode or the front position for the front-faced pushing mode.

When the remote-control device 40 is operated to pull up the stopping member 30 in an unlocking direction, and the handle 15 is turned to the back position, the back stopping projection 29 is received through the open end 31a in the first groove 31. Then, the stopping member 30 is moved axially downward to engage the back stopping projection 29 in the first groove 31 as shown in Fig. 6. Consequently, the handle 15 is fixedly held at the back position for the back-faced pushing mode as indicated by continuous lines in Figs. 2 and 5. When the stopping member 30 is pulled upward as indicated by chain lines in the unlocking direction and the handle 15 is turned to the front position, the front stopping projection 28 is received in the second groove 32, and the stopping member 30 is moved downward, the handle 15 is held fixedly at the front position for the front-faced pushing mode as indicated by two-dot chain lines in Figs. 2 and 5.

The body structure can be folded and unfolded with the handle 15 locked on the body structure, in which the back stopping projection 29 is engaged in the first groove 31 of the stopping member 30.

The front stopping projection 28 is cylindrical. As shown in Figs. 6 and 7, the back stopping projection 29 has a cylindrical part 29a capable of being rotatably engaged in the first groove 31 of the stopping member 30, and an end part 29b formed at the extremity of the shaft part 29a. Figs. 6 and 7 are views of a part of the stroller 10 on the left side as viewed facing the front of the stroller 10 taken from the inside of the body structure. The end part 29b is an elliptic part having a minor axis of a size equal to the diameter of the shaft part 29a. The major axis of the elliptic end part 29b extends along the axis of the handle 15 when

the body structure is unfolded and the stopping projection 29 is at a position shown in Fig. 6, and the same extends in a direction perpendicular to the axis of the handle 15 when the body structure is folded and the stopping projection 29 is at a position shown in Fig. 7. As shown in Figs. 6 and 7, a groove 31b for receiving the end part 29b of the stopping projection 29 is formed in the first groove 31 of the stopping member 30 in which the stopping projection 29 is engaged, with the groove 31b being formed in a part of the side wall extending along the axis of the handle 15. A step 31c that engages with the end part 29b of the stopping projection 29 at a position shown in Fig. 7 when the body structure is folded to stop the axial upward movement of the stopping member 30 along the axis of the handle 15 in the unlocking direction is formed in one end of the first groove 31.

When the unfolded (Fig. 6) or folded (Fig. 7) in a state where the stopping projection 29 is engaged in the first groove 31 of the stopping member 30 and the stopping member 30 is biased downward, i.e., in a locking direction, along the axis of the handle 15, the stopping projection 29 engaged in the first groove 31 of the stopping member 30 turns relative to the stopping member 30, and the condition of engagement of the stopping projection 29 and the first groove 31 of the stopping member 30 changes according to the angular position of the stopping projection 29 relative to the groove 31 of the stopping member 30.

When the stroller is unfolded and the armrests 16 are held at the working position, the major axis of the end part 29b of each stopping projection 29 extends in parallel to the axis of the handle 15 and hence the handle 15 can be unlocked. Then, the stopping member 30 can be pulled up in the unlocking direction by operating the remote-control device 40 and, when necessary, the handle 15 can be unlocked and can be turned from the back position for the back-faced pushing mode to the front position for the front-faced pushing mode.

When the body structure is folded and the armrests 16

are turned upward from the working position, the stopping member 29 turns relative to the stopping member 30 and the end part 29b of the stopping projection 29 is located with its major axis extended perpendicularly to the axis of the handle 15 and with a part thereof lying in the groove 31b as shown in Fig. 7. When the remote-control device 40 is operated wrongly to pull up the stopping member 30 to change the position of the handle 15 in a state where the stroller is folded, the end part 29b engages with the stepped part 31c to restrain the stopping member 30 from upward movement (movement in the unlocking direction). Thus, the handle 15 is prevented from being accidentally unlocked due to the wrong upward movement of the stopping member 30 and hence the forward or backward fall of the body structure can be surely prevented.

Referring to Fig. 4, an unlocking member 33 is put on a part of the handle 15 extending below the stopping member 30 so as to be operated by the remote-control device 40 for sliding motion along the handle 15. The unlocking member 33 is biased downward (in a locking direction) by a spring 34a extended in the handle 15. An unlocking rod 35 projects outside from the unlocking member 33. An operating plate 36 projects outside from the locking member 26 mounted on the pipe 17 parallel to the handle 15 so as to extend over the unlocking rod 35. When the unlocking member 33 provided with the unlocking rod 35 is pulled upward, the unlocking rod 35 comes into engagement with the operating plate 36 and pushes the locking member 26 up to release the bracket 25.

The remote-control device 40 for locking the body structure in either a folded state or an unfolded state and for locking and unlocking the handle 15 will be described with reference to Figs. 8 and 9.

Referring to Fig. 8 showing the remote-control device 40 in an exploded perspective view, a frame 41 having the shape of a channel is connected to the handle 15 by the joints 61a and 61b as shown in Fig. 1. The frame 41 has opposite side walls 42. Two pulleys 43a and 43b are held for rotation

on the side walls 42. Wire cables 44a are connected to diametrically opposite parts of the pulley 43a, respectively, and wire cables 44b are connected to diametrically opposite parts of the pulley 43b, respectively. The wire cables 44a and 44b are extended through the handle 15. The wire cables 44a connected to the pulley 43a are connected to the stopping members 30, respectively. The wire cables 44b connected to the pulley 43b are connected to the unlocking members 33, respectively (Fig. 4).

As shown in Fig. 8, operating levers 45a and 45b of a U-shaped cross section have base ends pivotally connected to the frame 41. The operating levers 45a and 45b are biased so that extremities thereof project from the frame 41 by springs 46a and 46b, respectively. The operating levers 45a and 45b have driving projections 62a and 62b connected to the pulleys 43a and 43b, respectively. A locking plate 47 is put on the frame 41 so as to slide along the upper edges of the side walls 42 of the frame 41. As shown in Figs. 9(a) to 9(c), a guide slot 48 is formed in an end part of the locking plate 47 and a stopping pin 49 provided in the frame 41 is engaged in the guide slot 48 to limit the range of movement of the locking plate 47. The opposite side walls of the locking plate 47 are provided with restricting parts 50a and 50b, respectively. The restricting parts 50a and 50b are able to come into engagement with upper ends of the driving projections 62a and 62b, respectively.

In a state shown in Fig. 9(a) where the locking plate 47 is operated, the locking plate 47 is biased by a return spring 51 in a restricting direction, the lower end parts of the restricting parts 50a and 50b are at operating positions on the upper ends of the driving projections 62a and 62b of the operating levers 45a and 45b, respectively, to exercise a locking function. In this state, the driving projections 62a and 62b cannot be raised even if an operating force is applied to the operating levers 45a and 45b, so that the safety of the remote-control device 40 is assured.

When the locking plate 47 is moved in the direction of

the arrow as shown in Fig. 9(b), the restricting parts 50a and 50b are shifted from the positions on the upper ends of the driving projections 62a and 62b of the operating levers 45a and 45b to neutral positions, respectively. Thus, the restricting parts 50a and 50b are moved away from the driving projections 62a and 62b. A base end part of the locking plate 47 is biased downward by the return spring 51. Therefore, a stopping projection 52a formed on the top wall 52 of the operating plate 47 is engaged in a groove 53 formed in an upper edge of the frame 41 to hold the locking plate 47 temporarily at an open position when the locking plate 47 is moved in the direction of the arrow as shown in Fig. 9(b).

Referring to Fig. 9(c), when the operating lever 45a or 45b of the remote-control device 40 in the state shown in Fig. 9(b) is operated to raise the driving projection 62a or 62b, the pulley 43a or 43b is turned to pull the wire cables 44a or 44b for remote-control operation. When the pulley 43a or 43b is thus turned, projection 54 projecting from the circumferences of the pulley 43a or 43b engages with the top wall 52 of the locking plate 47 to raise the operating plate 47. Consequently, the stopping projection 52a is disengaged from the groove 53. Therefore, when the force applied to the operating lever 45a or 45b is removed from the operating lever 45a or 45b, the locking plate 47 is returned automatically and instantly to its initial position to prevent accidental operations. Thus, remote operations for folding and unfolding the body structure and for locking and unlocking the handle 15 are possible.

The wire cables 44a pull the stopping members 30 along the axis of the handle 15 in the unlocking direction against the resilience of springs 34a to unlock the handle 15 when the operating lever 45a is operated. Consequently, the handle 15 can be turned forward to the front position for the front-faced pushing mode or backward to the back position for the back-faced pushing mode.

When the other operating lever 45b is operated after placing the handle 15 at the back position for the back-

faced pushing mode, the wire cables 44b pull the unlocking members 33 against the resilience of the springs 34a to pull up the locking members 26 through the unlocking rods 35 and the operating plates 36, whereby the brackets 25 are released from the locking members 26. Consequently, the armrests 16, the front legs 12 and the back legs 14 can be turned upward to positions indicated by two-dot chain lines in Figs. 3 and 10 to fold the body structure in two to facilitate carrying the stroller.

As shown in Fig. 1, the front connecting bar 20, the back connecting bar 21 and the upper connecting bar 24 are provided with joints 20a and 20b, joints 21a and 21b, and joints 24a and 24b, respectively, to make the front connecting bar 20, the back connecting bar 21 and the upper connecting bar 24 foldable. Outer parts 15a and 15b of the handle 15 can be turned forward on the joints 61a and 61b, respectively. When the stroller 10 is folded such that the front legs 12 and the back legs 14 extend in parallel to each other, the joints 20a, 21a, 24a and 61a are aligned on a line, the joints 20b, 21b, 24b and 61b are aligned on a line, and those two lines are parallel.

When the outer parts 15a and 15b of the handle 15 are turned forward after folding the stroller 10 such that the front legs 12 and the back legs 14 are parallel to each other, the respective outer parts 15a and 15b of the handle 15, the front connecting bar 20, the back connecting bar 21 and the upper connecting bar 24 are turned forward on the joints to fold the stroller 10 compactly in three as shown in Fig. 11.